2007-2026
Highway System Plan

Technical Update

December 2008

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Contents

Changes from the 2007-2026 Highway System Plan

The purpose of the 2007-2026 Washington State Highway System Plan (HSP) Technical Update is to focus, and expand upon the following subject areas of the 2007-2026 HSP:

- **Further analysis of selected Mobility Solutions** – WSDOT prepared planning level traffic and benefit/cost analyses on some of the mobility solutions indentified in the 2007-2026 HSP. Special emphasis was placed on Tier I solutions (Low-cost projects that deliver a high return on capital investment and have short delivery schedules). Examples of Tier I solutions include Intelligent Transportation System (ITS), access management projects, ramp modifications, turn lanes, intersection improvements, and incident management. (Details can be found in Appendix R.)

- **Inter-modal Connections with Ferries and Ports** – This area was updated to further develop strategies that improve the connections between state highways, ferry routes and ports. (See page 80 of 2007-2026 HSP)

- **Economic Vitality – Support the Economy** – This section has been updated to reflect the policies and goals of the Washington's Transportation Plan (WTP), and Washington State Department of Transportation (WSDOT)'s efforts to identify needs, strategies and performance measures in the following three areas: Freight Transportation Network; Community Economic Development; and Tourism and Scenic Byways. (See pages 83-91 of 2007-2026 HSP)

- **Performance Measures – Development/ Refinements** – Define and expand on performance measures for the Health and the Environment section within the following areas: Fish Passage Barrier Removal; Habitat Connectivity; Chronic Environmental Deficiencies; Stormwater Management; Noise Barrier Retrofit; and Bicycle Transportation, Pedestrian Walkways and the Environment. (See pages 93-106 of 2007-2026 HSP)

WSDOT intends to update the Highway System Plan every two to three years and use it as a guide to the highway portion of the Capital Improvement and Preservation Program. Each update of the Highway System Plan covers emergent issues and builds upon previous plans, refining identified needs, strategies, solutions, and performance measures.

As WSDOT continues to move forward, we hope the Highway System Plan provides useful guidance for this and future budget development cycles.

Overview

Economic Vitality (Replaces the "Economic Vitality" part of the 2007-2026 HSP Overview page 4)

There are three factors driving Washington's economic prosperity:

- The movement of freight
- Community Economic Development
- Tourism and Scenic Byways

Importing, exporting or shipping goods within Washington, businesses rely on the movement of freight to compete in a global economy.

Investments drive economic growth throughout Washington either in retail, housing, farming, or manufacturing.

Tourism spending in Washington generates significant annual tax revenue for state and local governments.

Washington was one of the first states to establish a system of scenic byways that pass through varied terrain reflecting the natural, cultural and historic landscapes of Washington.

Health and the Environment (Replaces the "Health and the Environment" part of the 2007-2026 HSP Overview page 4)

Investing in our transportation system can help address citizens' goals for a healthy environment. Environmental elements are considered part of every project's design, construction, operation and maintenance.

Highway construction projects address such environmental issues such as treating stormwater, protecting groundwater, controlling erosion, providing for fish passage, reducing noise, replacing or improving wetlands, habitat connectivity, and bicycle/pedestrian facilities.

Health and the Environment projects are stand-alone work, and include fish passage barrier removal, habitat connectivity, stormwater retrofit, chronic environmental retrofit, noise barrier retrofit, and bicycle/pedestrian facilities.

WSDOT works with Department of Fish and Wildlife (WDFW) to inventory, identify, and prioritize fish passage barriers that should be removed along the state highway system. The agencies have found 1,600 fish passage barriers among more than 6,000 stream crossings on the state-owned highways.

To date, WSDOT has removed 205 of these barriers and gained over 480 miles of stream habitat for fish use. The effort to fix barriers continues and is a high priority in the HSP.

How the Highway System Plan Connects to Climate Change Issues (This part is an addition to the 2007-2026 HSP Overview page 4)

Guidance on strengthening environmental stewardship continues to develop in Washington State. This Highway System Plan connects to several environmental policies, including but not limited to the five policy goals contained in RCW 47.04.280,[1] the Governor's Priorities of Government,[2] the 2001 WSDOT Environmental Policy Statement,[3] and the 2008 WSDOT Strategic Plan.[4]

Addressing climate change effectively is an emerging challenge for WSDOT. We recognize that transportation planning for Washington's highway system is directly connected to the topic of climate change in two ways;

- how the transportation infrastructure is affected by the changing climate and,
- how transportation contributes to climate changing emissions such as greenhouse gases (GHG)

Planning for a resilient transportation system is important. The system needs to be able to adapt to changing climate conditions, as well as, reduce its contributions to increased greenhouse gas emissions. WSDOT is actively engaged in the state's GHG/Climate change activities and is a member of the climate action team. We recognize that transportation is the source of 47% of the state's GHG emissions and therefore transportation and transportation system planning at many levels will be a major focus of climate change actions.

This system plan contains preservation and improvement investments that increase the durability and performance of the transportation system. Preservation investments, for example, address flooding, stream bank failures, bridge and pier scour, and unstable slopes. Improvement investments address mobility needs and congestion reduction.

The challenges and opportunities of today, such as land use and development patterns, transportation efficient development, transportation access and mobility needs, transfer of development rights, and the statewide goal to reduce vehicle miles traveled and greenhouse gas emissions, will play a role in determining the priorities for future investments. As the topic of climate change continues to be defined by the Governor's Climate Action Team, the Washington State legislative process, and possibly, the federal government, we recognize that new policies will shape future updates to the WSDOT Highway System Plan.

At the time that this Highway System Plan went to press, the Governor's Climate Action Team is in the process of preparing a report to the legislature with recommendations for the state's climate action plan. The 2009 legislative session is expected to take additional action on the topic of climate change. Exactly how transportation plans will be required to respond is currently undefined. It should also be noted that as vehicle miles traveled (VMT) is reduced statewide resulting from people driving less, there is a direct negative relationship to transportation funding. As the policies, strategies, and tools for reducing GHG and VMT are further developed, we are aware of the implications for transportation revenue that provides a safe, efficient, and reliable transportation system.

[1]RCW 47.04.280 Transportation system policy goals. (d) Environment: To enhance Washington's quality of life through transportation investments that promote energy conservation, enhance healthy communities, and protect the environment; and

[2]Natural Resources, Indicators & Measures: Reduce negative impacts on the environment

[3] Excerpt: The Department of Transportation acknowledges the state's vital interests in protecting and preserving natural resources and other environmental assets and its citizens' health and safety. These interests must be integrated with other vital interests committed to the Department, including the cost-effective delivery and operation of transportation systems and services that meet public needs.

[4]Objective 5.7 Planning and Prioritization: Provide long-term plans and investment programs that are strategic, data-based, prioritized, and supported by the Legislature and the public.

Improvement

Mobility (This section replaces the "Ferry Terminals and Multi-Modal Connections" part of the 2007-2026 HSP Mobility section page 80)

Multi-Modal Connections with Ferries and Ports

(see Photo 38)

Introduction:

Connections between state highways, ferry routes and ports form a vital link in the state transportation system. This section of the Highway System Plan update identifies and describes conceptual solutions for these connections in the central Puget Sound region (King, Kitsap, Pierce and Snohomish Counties). The focus of our work is on the land-side connections to ferry terminals and various ports. The inter-modal connections included in this update consist of existing WSDOT "Nickel" and Transportation Partnership Account (TPA) projects along with several local improvement projects. In addition to the projects listed, WSDOT has several corridor studies underway or completed that relate to intermodal connections.

Highway/Ferry Linked Solutions: Goal & Strategies

WSDOT recognizes the importance of improving the highway connections leading to ferry terminals. Several new terminals in the central Puget Sound Region (Edmonds and Mukilteo) are in the planning and environmental evaluation process. When completed, these terminals will improve connections between state routes 104 & 525 and Washington State Ferries (WSF) cross-sound routes. Ferry levels of service wil be determined in the WSF long-range plan, therefore it is not yet posssible to accurately assess benefits to land-side traffic from these terminal projects.

The goal of the proposed solutions between landside state highways and the WSF cross-sound routes is to move vehicles associated with ferry system travel as expeditiously as possible through the connecting landside corridor so as to minimize state highway congestion and the disruption of traffic on local arterials.

The State highway strategies to achieve this goal could include:

Photo 38. Ferry Terminal Traffic

- Better signage to prevent driveway and intersection blockages.
- Construction of Left-turn channelization at intersections where appropriate.
- Synchronize traffic signals to move ferry platoons through the community more efficiently.
- Construct transit-queue jumps to increase transit speed and reliability.
- In appropriate select locations, construct local arterial overcrossing or undercrossing of the state highway.
- Development and implementation of appropriate Transportation Demand Management (TDM) strategies to help minimize growth in vehicle travel along cross-sound ferry routes.

A number of the strategies here are (ITS) elements and could be low-cost improvements. They could provide a relatively high benefit-cost (B/C) ratio given their low cost and possibly high benefits in terms of improved safety, throughput operations and/or mobility. TDM strategies could also be a fairly low-cost/high benefit improvement option for specific deficiencies at a given land-side/ferry connection.

Other strategies such as a highway overcrossing/undercrossing will be higher cost and will require detailed project environmental/design work to determine their feasibility for implementation. It is

not possible to provide more specificity or detail here regarding specific project level solutions and implementation due to the need to complete the WSF Long-Range Plan and associated legislative requirements for ferry system planning.

In addition to the physical improvements now being studied, the WSF Long Range Plan is examining peak-period pricing as a way to alleviate peak-period congestion. There are also several pilot "reservation" system proposals under study. These measures are being driven by legislative requirements to consider demand-management and operational strategies prior to the development of major capital investments. The Ferry Financing Legislation (ESHB 2358) states that: "...it is the intent of the legislature that WSF be given the tools necessary to maximize the utilization of existing capacity and to make the most efficient use of existing assets and tax dollars." This legislation specifically directs WSF to study: 1) Ridership forecasts; 2) Level of Service Standards; 3) Operational Strategies; 4) Pricing Strategies; and 5) WSF Terminal Design Standards. It is likely this new approach will result in revised plans for facility improvements and new operating policies. These measures have the potential to minimize traffic impacts at terminals and to enhance connections between state highways and ferry routes.

Economic Vitality (This section replaces all of the "Economic Vitality" part of the 2007-2026 HSP pages 83-91)

The economy of Washington State depends heavily on the predictable movement of goods and people throughout the State. The Washington State Transportation Commission has established the following policies and goals:

Existing Commission Policies *(Source: WTP page 86)*

- Support the economy through reduced barriers to the movement of people, products, and information.
- Support investments in freight transportation services and infrastructure that maintain Washington State's competitive geographic advantage for world and domestic trade, and contribute to the economic productivity of the state.
- Value the movement of freight and people equitably.
- To the degree possible, streamline laws and regulations impacting freight transportation to allow ease of compliance and coordinated administration among jurisdictions.
- Support transportation investment that contributes to economic development.
- Support those aspects of the transportation system that enhance tourism.
- Develop connections across interstate and international borders.

WSDOT's goal is to facilitate economic vitality around the state: *(Source: WTP page 59)*

- Strengthen regional economies and growth in freight industries.
- Improve all-weather accessibility over Snoqualmie Pass.
- Address mainline rail freight constraints through a strategic plan and direction.
- Provide a more reliable and efficient statewide transportation system so businesses can meet customer delivery requirements.

WSDOT has a vision for a reliable, responsible and sustainable transportation system. These goals support our state's growing economy, maintain freight access to major markets and seaports, lower business costs, and sustain jobs in manufacturing, agribusiness, construction, warehousing, and transportation. Using these policies and goals, we are delivering projects that are expected to produce the following benefits:

- Ensure market access and connectivity by completing the north-south freight corridor.
- Relieve congestion in the Puget Sound region by improving I-5 and creating better access for freight.
- Ensure freight rail capacity is able to accommodate future demand and remain a viable option for the movement of goods.
- Prevent increased congestion on alternative corridors and support growth of regional and national trade.
- Reduce severe-weather closures on Snoqualmie Pass and other major east-west highway freight corridors.
- Ensure that Washington State agricultural growers and processors, manufacturers and timber/lumber businesses, and freight-dependent industries can ship products to market year-round enabling the state to remain competitive.
- Reduce travel delay, safety hazards, and congestion for commercial vehicles and minimize air quality impacts from vehicle idling, while ensuring the state's highway system is protected from overweight and illegal vehicles. *(Source: WTP page 74)*

The three factors driving Washington's economic prosperity are the movement of freight, community economic development and tourism. Each one of these three factors will be discussed by breaking them up by the following sections:

- Overview (Definition of the issue)
- Identification of criteria and needs
- Strategies to address the needs and the performance measures to determine the effectiveness of each strategy

The movement of freight throughout Washington is critical to make sure businesses can compete

in the global economy. Some businesses either depend on incoming shipments of goods for resale, or manufacturing. Many also depend on our transportation network to ship their goods either within Washington's borders or to other states or countries. In 2007, Washington's freight transportation network supported 1.026 million jobs in our freight-dependent industry sectors, producing $433.9 billion dollars in gross business income. *(Source: WSDOT Freight Division Office, August 2008)*

Economic growth in some areas is driven by investments that create new or enhance existing retail or manufacturing facilities. This can spur additional growth of new residential developments, providing local housing for the additional workers needed for these developments. Other developments may provide more affordable housing, creating "bedroom" communities, which encourages the growth of local retail establishments.

Tourism dollars drive many rural economies. For example in Skamania County, tourism dollars account for as much as 24 percent of the total employment and 16.2 percent of total earnings. Urban counties also benefit from tourist's spending. In 2006, over $2 billion was spent in King County alone. Statewide tourism spending in 2006 was $13.9 billion accounting for $912 million in tax revenue for state and local governments. *(Source: Pages 12 and 15, "Washington State County Travel Impacts 1991-2006", Dean Runyan Associates, October 2007)*

Movement of Freight

Predictable, reliable movement of freight touches every aspect of Washington's economy. International and national trade, manufacturing and local retail all relies on Washington's freight transportation network. Our highway system provides the connections to railroads, air and marine ports for goods moving to, through and from Washington businesses. The three components of Washington State's freight transportation network:

- **Global Gateways** – International and national trade flows through Washington
- **Made in Washington** – Regional economies rely on the freight transportation network
- **Delivering Goods to You** – The retail and wholesale distribution system

These underpin the national and state economies, support national defense, directly sustain hundreds of thousands of jobs, and distribute the necessities of life to every resident of the state every day.

First, Washington is a gateway state, connecting Asian trade to the U.S. economy, Alaska to the Lower 48, and Canada to the U.S. West Coast. About 70 percent of international goods entering Washington pass through the state's freight transportation network to the larger U.S. market. The other 30 percent becomes part of Washington's manufactured output or is distributed in the state's retail system.

Second, the manufacturers and farmers in Washington rely on the freight transportation network to ship their products to international and national marketplaces as well as the local marketplace. Finally, Washington's distribution system is essential to local communities, since without it the state's residents and businesses would have nothing to eat, nothing to wear, nothing to read, no spare parts, no fuel for their cars and no heat for their homes. In other words, the economy of the state would no longer function.

Globalization, competitive industry trends, and new technologies are pushing freight volumes up twice as fast as Washington's overall population and traffic growth. While our population grew from more than four million to more than six million from 1980 to 2005 (almost 50 percent) and is projected to grow to more than eight million (over 37 percent increase) by 2030, growth in the freight system is increasing at a much higher rate.[1] Truck trips increased by 94 percent on the Interstate 5 corridor, and by 72 percent on the Interstate 90 corridor, between 1993 and 2003.[2] From 1998 to 2020, freight volumes in Washington State are expected to increase by 80 percent.[3]

Global Gateways – International and National Trade Flows Through Washington

Washington is an important and growing global gateway for trade access to the Pacific Rim, Canada and U.S. (See Figures 56, 57, and 58). The state's freight transportation network serves the national

[1] *Washington State Office of Financial Management*
[2] *Washington State University, Strategic Freight Transportation Analysis*
[3] *U.S. Department of Transportation*

Figure 56. Trade through Washington

by volume

Figure 57. Washington State Value of Freight Shipments, 2005

in billions of dollars

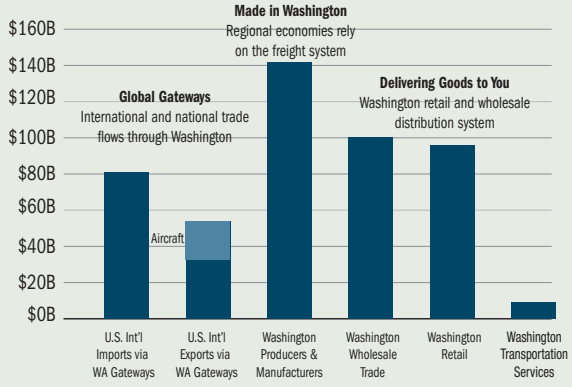


Figure 58. Central Puget Sound Container Port to Regional Distribution Center

economy and national defense. It also provides competitive advantage for logistics and trade, manufacturing, agribusiness and timber/wood products sectors.

Globalization, in particular the emergence of China and Asia as an important part of the "factory floor" for the United States, will double the volume of imported container freight entering the Ports of Seattle and Tacoma by 2025.[4] Midwest and East Coast consumers, at the far end of the Asia-to-U.S.

supply chain, purchased about three-fourths of the international goods entering Washington ports in 2005. Most of these goods are shipped to the Midwest in containers via rail.

Washington's export and import distribution facilities are concentrated in the Kent and Auburn Valley. They have no practical alternative access to the state's most heavily used and congested north-south freight routes:

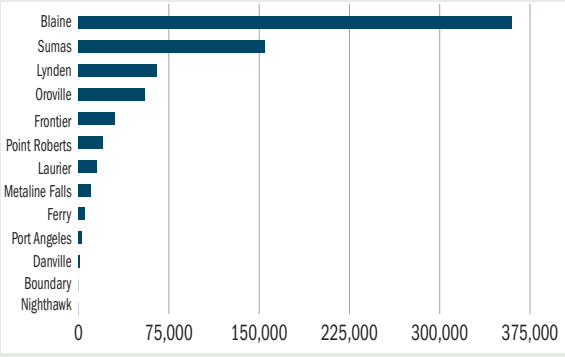
- Interstate 5
- Interstate 405-SR 167
- SR 99 Alaskan Way Viaduct
- SR 509

Delay costs everyone. Consumer goods cost more. Shippers turn fewer shipments to the ports. Manufacturers have shorter windows to ship air cargo. Worst of all, it takes more trucks to ship the same volume, as each truck gets fewer trips per day.

Domestic and global security and defense depends on the United State's ability to rapidly employ force when needed. Fort Lewis is the only Power Projection Platform on the West Coast. In the event of a major conflict, essential equipment and supplies will rush to Fort Lewis from all over the U.S. by rail and road, then ship through the Ports of Tacoma, Olympia and Seattle to support the troops. The military traffic will attempt to surge through highway freight systems that have already reached their capacity limits on Interstate 5 in Central Puget Sound.[5]

Figure 59. Trucks Entering Washington State from Canada

Total in 2005



Washington's largest shipping export is food, mostly grain. Eighty-five percent of eastern Washington wheat is shipped to Asia via Columbia River ports, but farmers struggle to get product through the state's freight transportation network.[6] For example, growers can't get produce off the farm for two months a year due to weight-restrictions on county roads.

By far, Washington's largest shipping import is crude oil from Alaska, shipped to the state's refineries.[7] Refined product: gas, diesel and jet fuel, then moves by pipeline or barge to distribution centers and is trucked to gas stations. The Olympic Pipe Line, currently operating at close to 100 percent capacity, has no plans to add pipeline capacity in the state.[8]

Cross-border truck volumes (see Figure 59) have nearly doubled at western Washington crossings over the past 11 years.[9] Growth has strained border crossing facilities and enforcement agencies processes, resulting in queues of trucks north and southbound waiting to cross.

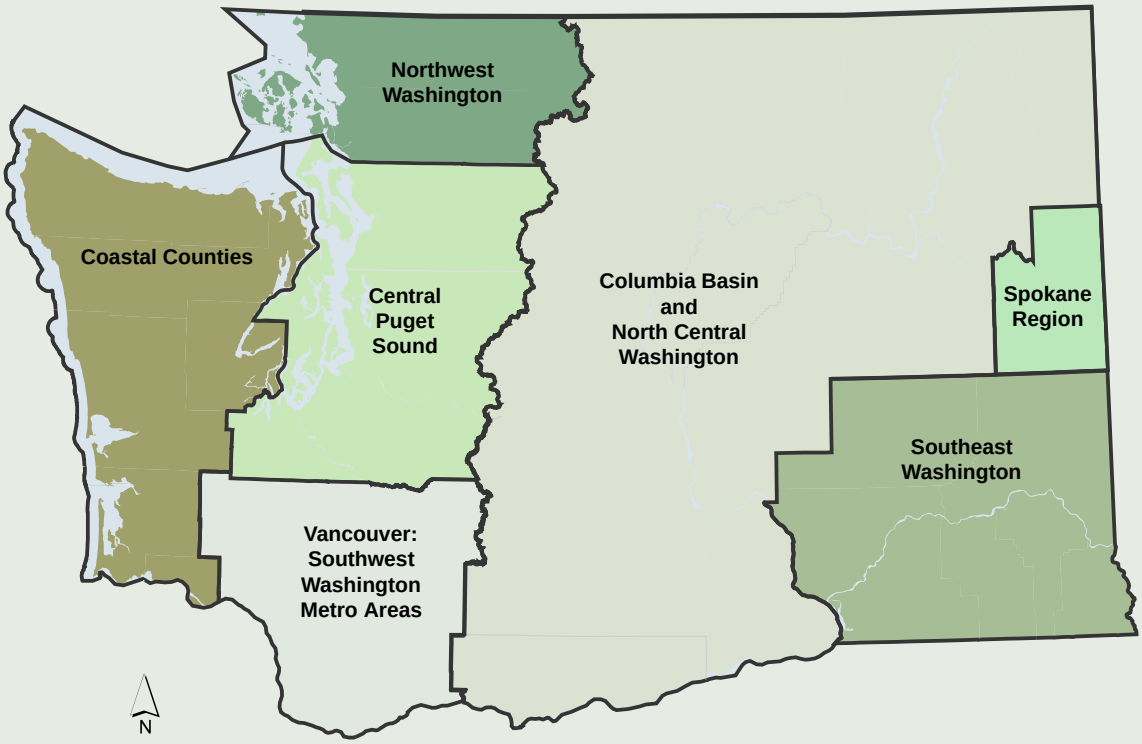
Made in Washington – Regional Economies Rely on the Freight System

Our state's regions (see Figure 60) have built strong and distinct economies based on industry and agriculture. Regional manufacturing, agriculture, construction, and forestry depend on an effective and efficient freight transportation network.

Over 519,000 jobs in regional manufacturing, agriculture, construction and forestry depend on Washington's freight transportation network, and accounted for $145.7 billion, or 36 percent of all state gross business revenues in 2005.[10] Transportation is especially important for Washington agriculture because the state produces about three

[4]BST Associates. 2004 Marine Cargo Forecast
[5]Surface Deployment and Distribution Command – Transportation Engineering Agency
[6]Washington Wheat Commission
[7]U.S. Army Corps of Engineers
[8]Energy Information Administration
[9]Whatcom Council of Governments
[10]Washington State Office of Financial Management and Washington State Department of Revenue
[11]Washington State University, Strategic Freight Transportation Analysis

Figure 60. Washington State Regional Economies



times as much food – and for some commodities up to 20 times as much on a tonnage basis – as it consumes, and it is separated by long distances from the majority of the nation's consumers.[11]

Competitive pressure to cut inventories from every step in the manufacturing process is reshaping industrial supply chains, and causing more frequent freight shipments. As an example, the Boeing Company, employing 65,000 in Central Puget Sound, is Washington's largest manufacturer with $22.7 billion in airplane revenues in 2005. Boeing's dependence on the state's freight transportation network will become even greater as it sets new levels of efficiency in the manufacture of the new 787 Dreamliner. Boeing has historically made planes from up to a million smaller pieces and shipped them by truck, train and boat. To gain efficiency, they are using a new strategy that relies on major component assembly. Fewer parts, with more frequent deliveries, will support their just-in-time inventory reduction strategy.

Cost-cutting inventory reduction strategies are also underway at thousands of other mid-market manufacturers and producers around the state. For example, the Vancouver Frito-Lay plant receives up to 50 truckloads of fresh potatoes each week from growers in the Columbia Basin. The plant keeps just enough potatoes on hand for one eight-hour shift; if the potatoes do not arrive on time, the plant cannot run. WaferTech's one-million-square-foot semiconductor foundry in East Clark County can't function without fast and reliable air cargo; if a tool is delayed overnight in the supply chain from Taiwan, the plant will shut down and idle 1,000 employees. Farmers ship vegetable produce over 200 miles from Prosser to Costco in Central Puget Sound, and are required to deliver within 15 minutes of their scheduled appointment.

These competitive trends are repeated in thousands of manufacturing plants, construction sites, agricultural processors, and distribution facilities in Spokane, Bellingham, Tri-Cities and across the state – driving logistics practices towards perfect flow that puts more trucks on the road, more frequently, with ever-shorter delivery windows.

The freight transportation system plays a major role in regional economies all across the state. Spokane regional manufacturers, healthcare system

practitioners, as well as eastern Washington agricultural growers and processors, all cite severe winter weather closures on Interstate 90 at Snoqualmie Pass as eastern Washington's top freight priority. Northwest and southwest Washington manufacturers and trucking firms are also shipping to the Central Puget Sound region. The Columbia Basin and north central Washington agricultural center leads the nation in apple and potato production. Apples and potatoes must be shipped in refrigerated truck or rail cars; 90 percent are trucked to market. Continued refrigerated truck shortages are likely due to seasonal peak demand and an ongoing pull from other U.S. regions for refrigerated capacity.

Delivering Goods to You – The Retail and Wholesale Distribution System

Distribution is a critical component of the freight system, as it produces up to 80 percent of all truck trips in metropolitan areas, and serves the retail, wholesale and business services sectors.[12] Over 732,000 jobs are involved in the distribution system; accounting for $221 billion in 2005 gross business revenues, equal to 71 percent of total state revenues.[13] An enormous variety of goods are handled on this system; food and groceries, fuel, pharmaceuticals and medical supplies, retail stock, office supplies and documents, trash and garbage, construction materials and equipment.

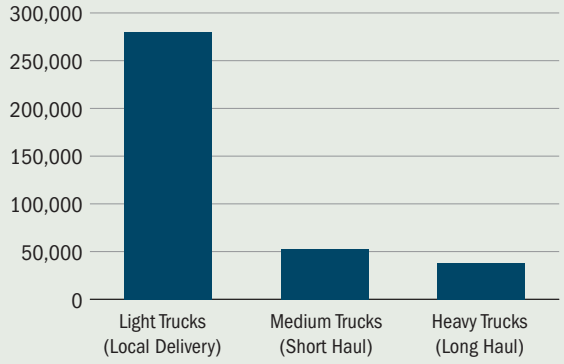
Washington's service economy depends on speed of delivery through the freight system. Distribution companies must provide fast and ubiquitous service that is reliable under all conditions. FedEx and UPS drivers do not go home until every package is delivered. Hospital patients cannot wait for drug deliveries. Many of these companies rely on the Interstate highways and the core freight system to reach population centers.

The most common method of distributing goods is by truck from large distribution centers to stores and businesses. When those trucks run into congestion, companies compensate for delays by sending more trucks out on the road, causing even more congestion. Land use costs are also causing higher truck volumes. For example, in response to increased consumer demand for a wider variety of food products, grocers are increasing overall store size and shelf space. Because backroom-storage of products doesn't generate sales, modern grocery stores are reducing their expensive, non-productive storage space and arranging for more frequent deliveries in smaller quantities (see Figure 61). One Seattle specialty grocery store, for example, receives 375 truck deliveries per week.[14]

New technologies enable companies to track more and more trucks, balance their inventories and capital usage, while managing very tight delivery windows. For example, UPS and FedEx's high-tech logistics services allow companies to track inventory on the Internet no matter which warehouse, truck, or other location holds their products. By implication, the greatest increase in overall truck volumes will be seen in many more, smaller trucks on the roads.

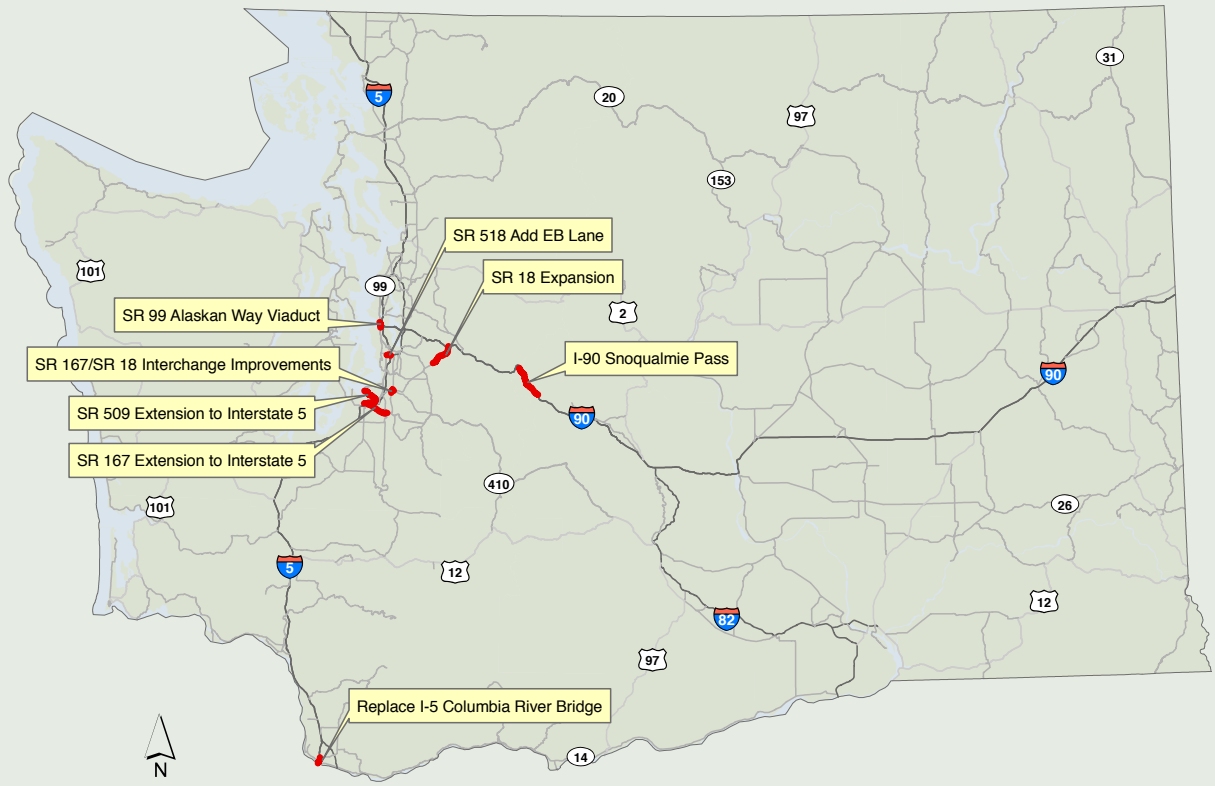
Growing urban areas need daily delivery of consumer goods; most are coming from the state's major distribution hubs in central Puget Sound. In order to achieve population and employment growth, the freight transportation network must be able to provide delivery of consumer goods to residents every day.

Figure 61. Most Commercial Trucks Licensed in Washington State Are Light



[12] *Cambridge Systematics, with TranSystems Corporation, Heffron Transportation, and the University of Washington*
[13] *Washington State Office of Financial Management and Washington State Department of Revenue*
[14] *Heffron Transportation, Inc.*

Figure 62. Deficiencies and Failing Structures on the Core Freight System Grid



Identification of Needs

WSDOT is currently developing a state "Freight Corridor Classification System" and companion "Freight Data Program" to evaluate the economic importance of major freight corridors. This analysis will support the Legislature's definition of strategic freight corridors as, "transportation corridors of great economic importance within an integrated freight transportation network." When fully implemented, this classification system and data program will:

- Identify the state's most important freight corridors and performance problems.
- Prioritize freight corridors by their ability to support state and regional economies.
- Give local, regional, and state transportation agencies useful information about all of the state's freight corridors.
- Produce weighted 'freight value' factors that government officials, transportation project managers, engineers and planners may use within their existing evaluation process or as a stand-alone when considering improvements to transportation facilities.

From 2004 – 2008, WSDOT interviewed hundreds of our state's high-volume shippers and freight carriers at their places of business, and surveyed trucking companies in partnership with the Washington Trucking Associations to identify and document their views of:

- Highway corridor performance requirements,
- Current system performance, and
- Freight system performance gaps.

WSDOT compared the performance gaps from the market analysis against currently programmed highway projects to identify the remaining high-priority issues. WSDOT also documented current freight demand, existing highway bottlenecks and chokepoints, and truck safety issues on the state's highway system by reviewing and organizing relevant statewide freight data. Then WSDOT worked towards predicting future freight transportation network demand. To do this, we assessed emerging strategic economic opportunities for freight-dependent industries in the state's regions, the probability of declining or stable markets, and associated freight transportation needs.

Appendix S provides a list of Proposed Low Cost Freight Solutions and Studies for the 2009-2011 biennium. Please note that highway projects with freight benefits such as I-90 at Snoqualmie Pass Phase 2, the Columbia River Crossing, and State Routes 167 and 509, are so noted in the mobility, safety, and paving and structures programs and are not listed again in Appendix S.

Freight Transportation Network Strategies and Performance Measures

Washington's economic vitality relies heavily upon a safe, efficient and reliable state highway system. Many of the strategies that address the predictable movement of goods and people throughout the state are outlined in the mobility section of this plan (see pages 67-79). Strategies that directly address the specific needs of the freight transportation network are currently under development and will be outlined in the next Highway System Plan update.

WSDOT is developing freight performance measures that matter to customers: manufacturing, agribusiness, construction, timber/wood products, wholesale and retail distribution sectors, and trucking, rail, barge, air -cargo, freight integrators and logistics sectors. Some of the preliminary strategies and related performance measures are as follows:

Strategy: Preserves the condition and/or improves safety of the state's highest-volume freight highway corridors: "super" T-1 freight corridors (carrying 25 million or more gross annual tons of freight per year).
Performance Measures: (1) The number of lane miles preserved on the state's "super" T-1 freight corridors. (2) Reduce the number of truck collisions on the state's "super" T-1 freight.

Strategy: Improve operational efficiency of T-1 highway segments (carrying more than 10 million tons of freight per year).
Performance Measure: Monitor the operational efficiency of T-1 highway segments.

Strategy: Replace or reconstruct height restricted bridges that currently restrict freight movement on T-1 or T-2 (carrying more than four million tons of freight per year) freight corridor segments.
Performance Measure: Report the number of height restricted bridges replaced or reconstructed. Report the reduction in the number of miles detoured.

Strategy: Replace or reconstruct weight restricted bridges that currently restrict freight movement on T-1 or T-2 freight corridor segments.
Performance Measure: Report the number of weight restricted bridges replaced or reconstructed. Report the reduction in the number of miles detoured.

Strategy: Replace or reconstruct low clearance restricted bridges that currently restrict freight movement on T-1 or T-2 freight corridor segments
Performance Measure: Report the number of low clearance restricted bridges replaced or reconstructed. Report the reduction in the number of miles detoured.

Strategy: Provide truck climbing/passing lanes on T-1 or T-2 freight corridor highways.
Performance Measure: Monitor the operational efficiency of locations where climbing/passing lanes were added.

WSDOT is also considering performance measures and associated data collection proposals to gauge progress towards:

- Making major cargo airports attractive for truck deliveries and pick ups
- Improving truck access and flow on highway networks in the state's metro centers
- Improving truck efficiencies between national mega-regions such as Vancouver B.C./ Bellingham, Seattle/Bellevue/Tacoma, Portland/ Vancouver WA, San Francisco/Oakland, and Los Angeles/Long Beach.

Community Economic Development

Recent trends show new investments in smaller communities lead to higher employment growth. A regional shift in economic investment to smaller communities can be attributed to higher costs associated with establishing businesses within more densely populated areas. Economic development within smaller communities is evident in the technology sector and new industries.

This regional shift is clearly visible in the technology sector. Established technology-rich communities like Seattle, Vancouver and Spokane have experienced a drop in technology jobs over the last two years, while Bellingham, the Tri-Cities and Bremerton all exhibited strong technology job growth.

Development of new industries in smaller communities has also created employment growth. The increased presence of Washington State as a premium wine producer has created a secondary effect in communities with wineries: an increase in tourism. The popularity of wine tours contributes to employment growth for these communities.

Identification of Needs

WSDOT is currently developing a methodology to determine the level of development and prioritization for community economic development to be included in future updates of the Highway System Plan.

The Development Services Manual is a major component of the department's overall strategy to promote a consistent statewide development review process and application of mitigation policies. This manual provides policies and procedures for: reviewing proposed developments; assessing development impacts to the state highway system; determining appropriate improvements and/or shared contributions to mitigate impacts; writing interlocal agreements and other agreements with local agencies and public and private parties; and considering access to the state highway system. *The Development Services Manual* is available at: http://www.wsdot.wa.gov/Publications/Manuals/M3007.htm

Potential criteria to identify and prioritize community economic development needs may include the following:

- Economic Growth/Jobs
- Commercial and Industrial Development
- Freight Mobility
- Financial partnerships

Tourism and Scenic Byways

WSDOT is committed to working with local communities to create the partnerships needed to develop access to scenic, recreational and cultural resources. WSDOT has established a number of highways as "Scenic Byways" to support tourism and recreational opportunities within the state. Our work with local communities to identify the locations where access is needed to support these emerging industries will be an ongoing effort. More detail on this work will be covered in future updates of the Highway System Plan.

Identification of Needs

The identification of needs for tourism and scenic byways is currently being refined and will be updated in future updates of the Highway System Plan. Potential criteria to identify and prioritize system needs may include the following:

- Climbing Lane/Passing Lane/Opportunities
- Access to Viewpoints
- Access to Recreational Opportunities

Strategies and Performance Measurement

Washington's economic vitality relies heavily upon a safe, efficient and reliable state highway system. Many of the strategies that address the predictable movement of goods and people throughout the state are outlined in the mobility section of this plan (see pages 67-79). Strategies and performance measures that directly address the specific needs of tourism and scenic byways are under development by WSDOT. Future updates to the Highway System Plan will define these further.

Health and the Environment

Fish Passage Barrier Removal (This changes page 95 of the 2007-2026 HSP)

Performance Measures

Fixing culverts contributes to the state's salmon recovery efforts as well as the state's efforts to restore the environmental health of Puget Sound. WSDOT characterizes benefits as the lineal miles of habitat opened up as a result of barrier removal. WSDOT also tracks the number of culverts that have been fixed or removed. Within a year of WSDOT completing a fish passage project, WDFW inspects each corrected barrier. Each project is checked for fish passage use, and certain sites are selected for long term studies to see if fish use continues and whether the design of the structure is working as intended.

Ten Year Planning Document

At WSDOT's direction, WDFW has prepared a prioritized list of fish passage projects to be constructed and evaluated over the next ten years. The Ten Year Plan is the result of a process of project evaluation, scoping, development of conceptual designs, and budget development. The plan is updated as projects are identified, prioritized, scoped, and refined. Project scoping is a multi-phased process that is carried out by WDFW biologists, environmental engineers, and WSDOT regional staff.

Habitat Connectivity (This changes page 97 of the 2007-2026 HSP)

Performance Measures

The most significant indicator of program success is a reduction in the numbers of wildlife-vehicle collisions. Data will be gathered on collision reporting and wildlife carcass removal, and maintained and improved to allow us to measure performance. New investments in monitoring wildlife use of crossing structures will be needed to measure performance in terms of animals safely crossing highways.

Other important measures of performance are the number of crossing structures or other permeability features installed and the number of miles of habitat enhanced for wildlife connectivity through installation of crossing structures or other permeability features that allow animals to cross highways safely.

What are the Benefits?

Reduced numbers of wildlife-vehicles collisions benefit nearly everyone via lower automobile insurance costs, a lowered risk of injury or even death from an automobile accident. Additional benefits accrue from reduced losses of wildlife. This can help prevent wildlife species from being listed under the Endangered Species Act. It also provides benefits to wildlife-associated recreation (hunting, wildlife watching) and healthier wildlife populations that are the basis for functioning ecosystems and a wide variety of ecosystem services that people depend upon for food, clean water, and an aesthetically pleasing environment.

Chronic Environmental Deficiencies (This changes page 98 of the 2007-2026 HSP)

Performance Measures

The Chronic Environmental Deficiences (CED) program uses a variety of tools to reduce repetitive maintenance activities that impact fish and fish habitat. The tools used to measure the benefits depend on what correction methods are used. One of the benefits for CED projects can be measured by the elimination or reduction in emergency maintenance actions which can then be translated into dollars saved. Environmental benefits can be measured by the habitat gained or improved on a project. For example a CED project may involve replacement of riprap along a river bank (installed by WSDOT Maintenance to protect the highway) with an engineered log jam designed to deflect the river away from the road. In this instance the area of river bank covered by rip rap (which provides no fish habitat) can be compared to the area of habitat provided by the engineered log jams.

Stormwater Management (This changes page 102 of the 2007-2026 HSP)

Performance Measures

Managing stormwater effectively cuts down on pollutants entering streams and rivers, contributes to Puget Sound and salmon recovery, and reduces flooding and erosion. Controlling water flow benefits fish habitat and reduces scour of bridge abutments, and culvert maintenance. Managing pollutants

benefits the health of aquatic animals, drinking water supplies and human recreation activities.

WSDOT can characterize benefit in terms of (1) acres of surface treated or (2) reductions in annual pollutant load. The first can be identified in the design. The second can only be estimated during design. In the future, the department wants to develop methods to measure and monitor pollutant loading from a variety of treatment facilities constructed for retrofit purposes.

WSDOT also measures its performance by the number of stormwater facilities built and compliance with the terms of the State Department of Ecology's Municipal Stormwater Permit which it plans to issue to WSDOT in 2008.

Noise Barrier Retrofit (This changes page 104 of the 2007-2026 HSP)

Benefits

Each time WSDOT builds a retrofit barrier in a location where sensitive uses like homes, schools, and parks were permitted for construction on or before May 14, 1976, the neighborhood behind the barrier receives audible relief from traffic noise. The number of benefited people who qualify for retrofits for the 61 locations currently on the list are estimated between 11,200 and 13,400. More people may benefit if additional homes and uses are also located in the area of the barrier.

Performance Measures

To qualify for retrofit funds, the barrier must provide certain sound reductions. Noise specialists will take measurements prior to construction to develop the final height and length requirements for the barrier. Once the barrier is complete, noise specialists will re-measure to determine the reduced sound levels and verify the number of benefited people.

Bicycle Transportation, Pedestrian Walkways and the Environment (This replaces all of pages 105 & 106 of the 2007-2026 HSP)

Bicycling and walking are two modes that signify a dynamic transportation system. They provide not only environmental and health benefits, but also a strategy to reduce traffic congestion and have a positive economic impact across the state.

Issues

WSDOT is committed to working with private and local governmental entities to develop a plan which identifies bicycle and pedestrian needs and cost effective strategies. This plan will be consistent with the Legislature's stewardship goal and satisfy requirements of RCW 47.06.100 as well as the 2008-2027 Bicycle Facilities and Pedestrian Walkways Plan.

The goal is to improve bicycle and pedestrian safety while increasing the number of people who bicycle and walk. The strategies for accomplishing these goals include: maximizing funding through partnerships; raising awareness of the needs for bicycle and pedestrian safety; and sharing information on bicycle and pedestrian issues between agencies, jurisdictions, and organizations in Washington State.

The rapid increase in obesity, diabetes, and asthma among children and adults in Washington State is a growing concern. Statistics from the Centers for Disease Control show that obesity trends among adults in Washington State have increased from less than 10 percent in 1991 to over 20 percent today. Personal transportation choices, the perceived limitations on personal mobility, and in some cases the lack of transportation alternatives have been implicated as contributing factors to these disturbing trends.

Needs

In response to these trends and research, several Washington communities have identified and benchmarked community health indicators that often include transportation measures such as the number of people walking and bicycling. Pedestrian and bicycling activity is a common measure of community health because this measure reflects many different aspects including safety, security, economic vitality, public health, and the quality of the natural environment. Other indicators of healthy communities include:

- available and affordable housing
- mixture of land use
- strong community leadership

- innovative neighborhood design
- interconnected pedestrian and bicycle facilities
- economic development initiatives
- creative stormwater management
- healthy wetland areas
- and improved air quality

Strategies

Collaborative partnerships to develop and implement transportation systems are improving the way people live and work together by increasing access to transportation services and the way we share information about travel. A comprehensive approach to designing transportation systems considers the compatibility of each project with community character and values, the environment, and the unique needs and desires of the community.

The ability to plan, participate in planning efforts, or develop a community's transportation future depends on having trained planning staff. This is a key issue for many of Washington State's tribes, small cities, and counties that lack funding for such planning capacity.

Grant Funding

The Washington State Legislature funded $74 million over the next 16 years to support pedestrian and bicycle safety projects, such as pedestrian and bicycle paths, sidewalks, safe routes to school, and transit.

The Pedestrian & Bicycle Safety program will address the nearly 400 statewide fatalities and injury collisions involving pedestrians and bicyclists each year. The purpose of the Pedestrian and Bicycle Safety program is to aid public agencies in funding cost effective projects that improve pedestrian and bicycle safety through engineering, education, and enforcement. Eligible projects may address the following:

A. Engineering Improvements – Projects may include items such as:
   - Improving intersections by providing: curb extensions, lighting, raised median, crosswalk
   - Enhancements, signs, signals, and mid-block crossing treatments
   - Completing bicycle lanes and sidewalks
   - Constructing bicycle and pedestrian paths
   - Providing safe routes to transit
   - Providing pedestrian and bicycle safety improvements for at-risk groups (children, the elderly, and people with disabilities)

B. Education Efforts – Projects may include items such as:
   - Implementation of educational curricula
   - Distribution of educational materials
   - Development of promotional programs for walking and biking

C. Enforcement Efforts – Projects may include items such as:
   - Additional law enforcement or necessary equipment for enforcement activities
   - Vehicle speed feedback signs
   - Neighborhood watch programs
   - Photo enforcement

Performance Measures

Performance measures are the indicators used to determine if a project or types of projects are worth the expenditure of public funds required to build them in the first place. Bicycle and pedestrian performance measures include:

- Reduction in the number of bicyclists and pedestrians involved collisions (fatal and non-fatal)
- Reduction in bicyclists and pedestrian fatalities for at-risk groups (Ages 0-14 and 71+)
- Net total linear miles of designated bicycle facilities (bike lanes and shared use paths)
- Increase in the number of bicyclists and pedestrians using state highway shoulders, trails and paths

Appendix J: New Solutions for 2007-2026 Technical Update

Key	Category	WSDOT Region	Highway Number	Milepost	Title	Current or Future Problem	Cost Estimate
421	Tier 1	Olympic	3	34.15 to 60.02	SR 3 - SR 16 Spur to SR 104 - ITS	Current	$8,700,000
	County	*Needs:*	SR 3 is a congested corridor segment. There is a need to address mobility, safety and operational deficiencies.				
	Kitsap	*Solution:*	Install Intelligent Transportation Systems (ITS) including Closed Circuit Television (CCTV), data station, Highway Advisory Radio System (HARS), Highway Advisory Radio Transmitter (HART), ramp meter, Variable Message Sign (VMS), and fiber optic line.				
		Expected Benefits:	The provision of ITS project improvements here will improve SR 3 operations and will help address congestion and safety deficiencies.				
		Known Environmental Issues:					
422	Tier 1	Olympic	303	3.75 to 3.91	SR 303 - Riddle Rd. to McWilliams Rd. - Access management and intersection improvements	Current	$3,065,000
	County	*Needs:*	High traffic volumes combined with a large number of private driveways and intersections are the primary cause on congestion on this highway segment.				
	Kitsap	*Solution:*	Provide access management and intersection improvements.				
		Expected Benefits:	Access management and intersection treatments here will address congestion deficiency and improve traffic flow.				
		Known Environmental Issues:					
423	Tier 2	Northwest	169	22.08 to 25.26	SR 169 - 152nd Ave. SE to I-405 - Widen from 4 to 6 lanes	Current	$92,000,000
	County	*Needs:*	High traffic volumes and truck percentages of 10.6% lead to heavy backups an significant delays.				
	King	*Solution:*	Widen from 4 to 6 lanes.				
		Expected Benefits:	Improvement of freight and general GP traffic flow.				
		Known Environmental Issues:	There is one proposed noise wall located from Fifth Ave SE, Monroe Avenue to SE 5th Street. There are several stormwater outfalls with the solution limits.				
424	Tier 3	Northwest	167	25.74 to 27.16	SR 167 - S 180th St to I-405 - NB Auxiliary Lane	Current	$17,000,000
	County	*Needs:*	High traffic volumes combined with merging traffic causes frequent backups in this stretch of SR 167.				
	King	*Solution:*	Add NB Auxiliary Lane.				
		Expected Benefits:	The addition of auxiliary lanes will improve SR 167 mainline operations and will help improve safety on SR 167.				
		Known Environmental Issues:	SR 167 is surrounded by wetlands that flood easily. WSDOT is using a new tool called Watershed characterization to identify sites where we can improve and/or create wetlands to hold and naturally filter the water.				

Appendix M: Highway/Ferry Linked Solutions

Coordination for highway and ferry needs for corridor links in King, Pierce, Kitsap and Snohomish Counties is accomplished between the Urban Planning Office and WSF. This work is accomplished in coordination with Olympic or Northwest Region. Planning for highway and ferry links in Puget Sound in other than these four counties is accomplished by Northwest and Olympic Region with WSF.

Highway	*Region*	*Ferry Route*
SR 104	UPO/Northwest	Edmonds-Kingston (Edmonds Ferry Terminal)
	Need(s)	Traffic volumes exceed existing terminal capacity causing severe impacts to local traffic, therefore a new terminal is being designed in a new location south of the existing terminal. This new terminal will be accessed by what is now a City Street (Pine Road). Additional capacity will be necessary to handle existing local traffic and platoons of ferry traffic.
	Solution(s):	Solutions include the following, operational improvements to SR 104 and additional capacity to Pine Road.NWR Traffic has a Q-program re-stripe project in summer 2008. They plan to develop a holding lane from 100th I/S down the hill to the point where the SR 104 ferry lane exits to the waterfront. The development of a WSF "reservation system" could negate the need for this holding lane with concurrent cost-savings. Long-term SHSP strategy here tied to the development of the new Edmonds Ferry/Multimodal Terminal. Edmonds MM Terminal has a federal ROD. Cost estimate for the terminal is approximately $160M (unfunded). "On Hold" pending completion of the WSF Long Range Plan/ESHB 2358 work.
SR 525	UPO/Northwest	Mukilteo-Clinton (Mukilteo Ferry Terminal)
	Need(s)	A new terminal to the north of the existing terminal location has been funded out of the Nickel gas tax.This new terminal in Mukilteo would help alleviate land-side congestion on the SR 525 in and adjacent to Mukilteo with additional terminal holding capacity and two ferry slips. The City of Mukilteo still desires to remove the SR 525 ferry-route out of the City center and continues to favor the idea of a re-algined SR 525 through an environmentally sensitive area known as Japanese Gulch. Considerable environmental and funding constraints would make a re-alingment of SR 525 through the Japanese Gulch infeasible.
	Solution(s):	There are currently two options to access this new terminal: 1) continue to access the new terminal via SR 525 and make improvements to the existing highway to accommodate the additional boat trip that is being planned. This could require some highway widening plus implementing operational improvements throughout the corridor. The other option is to build a new roadway down an environmentally sensitive drainage called Japanese Gulch. This is the City's preferred alternative as it would reroute all the ferry traffic to the north freeing up capacity on SR 525 and allowing free movement of their city streets which become impassable when the ferry platoon is off loading. Mukilteo Terminal project is "on-hold" pending resolution of environmental & funding issues. WSDOT NW Region Traffic has identified two short/meduim term strategies to address congestion on SR 525:**1)** Widen the ferry terminal holding area in Mukilteo;**2)** Widening SR 525 / Shoulder Lane up the hill for a holding lane. The WSF Ferry Reservation and Peak-Pricing program could negate the need for these projects if implemented at the Mukilteo Terminal. Results to be determined by the WSF Long- Range Planning Effort & ESHB2358 Legislative Work (Fall 2008).
SR 20	Olympic	Port Townsend-Keystone (Port Townsend Ferry Terminal)
	Need(s)	SR 20 from SR 19 to the Ferry Terminal is approaching maximum throughput capacities (Level of service E/F). Local "stop controlled" side street intersections have short "gaps" in traffic to make left and right turns because of heavy mainline traffic volumes. When ferry traffic arrives and departs from the ferry terminal in "surges" or vehicle "platoons" there are less "gaps" in traffic for side street "stop controlled" intersections which can "trap" local and emergency vehicles. Left turn storage lanes on mainline at major "stop controlled" intersections may also exceed capacity during peak periods.
	Solution(s):	Both WSDOT and the City of Port Townsend agree that the existing signal system at Kearney functions poorly due to a five-leg intersection. Short/medium range improvements include intersection improvements at Howard St/SR 20 & Mill Road/ SR20 plus median barrier on SR 20 between these two intersections (approximately 1/2 mile). Long-range operational/safety/capacity needs to be defined and provided in the SR 19/SR 20 Corridor Plan. Implementation of WSF Reservation system and Peak-Pricing options may negate the need for some/all operational imprvoements at the terminal and on SR 20 in Port Townsend. Olympic Region & WSF will jointly define strategies/solutions as a result of the SR 20 RDP and the WSF Long-Range Plan / ESHB2358 legislative requirements.
SR 104	UPO/Olympic	Kingston-Edmonds (Kingston Ferry Terminal)
	Need(s)	During summer weekend peaks, SR 104 experiences long vehicle queues by cars waiting to board the ferry system. These long queues "block" access to the local intersections in the Kingston community.The Kingston Terminal includes issues of occasional queue back-ups to Hansville-Miller Bay Rd. (aproximately five summer Sundays per-year). Downtown Kingston businesses also want to eliminate the two-way couplet and provide 2-way operation on all downtown streets. Olympic Region/Kitsap County Kingston CBD traffic analysis being conducted during the summer of 2008.
	Solution(s):	Implement Kingston Circulation Plan and construct remote ferry holding lot. Conceptual solution/ outcome pending the results of WSF/OR Reservations pilot project, potential recommendations of the Kingston Circulation Plan an the direction of the WSF Long Range Plan effort (Fall 2008). OR Traffic / Kitsap County modeling/ traffic analysis will recommend possible operational improvements. Implementation of WSF Reservation system and Peak-Pricing options may negate the need for some/all operational imprvoements at the terminal and on SR 104 in/adjacent to Kingston.

Appendix M: Highway/Ferry Linked Solutions

Coordination for highway and ferry needs for corridor links in King, Pierce, Kitsap and Snohomish Counties is accomplished between the Urban Planning Office and WSF. This work is accomplished in coordination with Olympic or Northwest Region. Planning for highway and ferry links in Puget Sound in other than these four counties is accomplished by Northwest and Olympic Region with WSF.

Highway	*Region*	*Ferry Route*
SR 160	UPO/Olympic	Southworth-Fauntleroy (Southworth Ferry Terminal)
	Need(s)	In 2030 the segment between SR 16 and Long Lake Road will be approaching maximum throughput capacity (LOS E/F). Bethel Road, which is between SR 16 and Long Lake Road, is a major local north-south corridor with existing and proposed private developments. WSF Long-range projections indicate that growth in vehicle-demand could be highest at the Southworth Terminal thus putting considerable demand on the SR 160 corridor in Kitsap County.
	Solution(s):	Widening to a four lane roadway with sidewalks, bike lanes, and a raised median between SR 16 and Long Lake Road. Development of park and ride lot near the interchange of SR 16 and SR 160 is also recommended. If a lot was constructed at this location, vehicle demand along Sedgwick Road could be reduced by capturing ferry-bound vehicles before they enter the SR 160 corridor and by providing transit service to the terminal. The addition of HOV treatments and signal preemption, HOV lanes and separate bus loading facilities at the Ferry Terminal is mentioned for the out-years of the RDP. (RDP Recommendations -1998). Provision of a WSF Reservation System and Peak-pricing at the Southworth Terminal could moderate vehicle demand at this terminal and on the adjacent SR 160 corridor.
SR 163	UPO/Olympic	Point Defiance-Tahequah (Point Defiance Ferry Terminal)
	Need(s)/	Development plans by the City of Tacoma Parks, for the Point Defiance Park may generate additional traffic volumes on SR 163. Traffic impacts to SR 163 are unknown at this time.City of Tacoma to conduct traffic analysis with WSDOT Olympic Region participation.
	Solution(s):	Signal timing and coordination are possible solutions. WSDOT will want to review the Park Traffic Impact Analysis (TIA) for traffic impacts when it becomes available. WSF changes in boat classes will not add significant traffic to the SR 163 corridor. No further changes envisioned on SR 163 corridor here. WSDOT will work with the City on traffic-impact issues from the Point Defiance Parks Development plan.
SR 304	UPO/Olympic	Bremerton-Seattle (Bremerton Ferry Terminal)
	Need(s)/	In 2030 SR 304 will be approaching maximum throughput (LOS E/F). The Bremerton tunnel is currently under construction to separate exiting ferry platoons from local cross-traffic.
	Solution(s):	Solutions to these identified needs are under development or study to find the appropriate balance of investments to best serve the local community. WSF identifies provision of a third boat on the Bremerton Route under a "high" investment level but increased service headways might not result in large increases in landside vehicle platooning on Sr 304 due to length of Bremerton-Seattle route. SR 3/ SR 304 interchange improvements previously idenfitied in EIS and are probably high-cost ($75-$80M). Arterial HOV on SR 304 also considered/implemented upto SR 3 I/C. Provision and implementation of a WSF Reservation System and Peak Pricing at the Bremerton terminal coul mitigate some future vehicle growth and need for addtional terminal investments. Other terminal/landside improvements to be identified/addressed as part of the WSF Long-Range Plan and legislative (ESHB2358) work.
SR 305	UPO/Olympic	Winslow-Seattle (Winslow Ferry Terminal)
	Need(s)	SR 305 on Bainbridge Island is approaching maximum throughput capacity and pedestrian/bicycle issues exist at the intersection of Winslow Way and SR 305. In addition to SR 305 corridor capacity issues, there are "cross-corridor" access issues for local Bainbridge Island traffic when platoons of vehicle traffic of-load at the Bainbridge Island terminal. WSF plans to hold current boat frequencies and boat capacity on the Bainbridge Route (no increases in boat frequencies). Funding currently exists for Bainbridge Terminal environmental analysis/early design (?) but this effort is currently "on-hold" pending completion of WSF LR Plan Development and legislative/ESHB2358 work. New Bainbridge Island Terminal design will have impacts on SR 305 corridor.
	Solution(s):	Solutions to these identified needs are under development or study to find the appropriate balance of investments to best serve the local community. Corridor improvement strategies on SR 305 will not include widening to four lanes but could include transit amenties such as a dedicated BRT lane, transit queue jumps or signal priority or other appropriate amenities. SR 305 cross-corridor improvements to facilitate improved local cross-traffic will also b considered. Provision and implementation of a WSF Reservation System and peak-pricing at the Bainbridge Island Terminal could negate the need for short/intermediate term holding-lane/storage requirements here.

Appendix R: Solutions with Advanced Analysis

The following list of solutions was developed to address mobility needs identified during the 2007-2026 HSP update process. Advanced analysis for these solutions was conducted during the 2007-2026 HSP Technical Update process. The current status for each solution's advanced analysis is detailed below. A detailed report will follow that shows the updated information at the time of publication of this document.

WSDOT Headquarters Systems Analysis and Program Development Office Reviewed and Approved

Key	Category	WSDOT Region	County	Highway Number	Milepost	Title
57	Tier 1	Olympic	Thurston	5	99.35 to 99.35	I-5/SR 121 (93rd Ave) I/C SB Off Ramp - Mobility
66	Tier 1	Olympic	Thurston	5	109.41 to 109.41	I-5/Martin Way Interchange Off Ramp - Mobility (Southbound)
105	Tier 1	Southwest	Clark	500	0 to 5.96	SR 500/I-5 to NE Fourth Plain Blvd - Install ITS
108	Tier 1	Southwest	Clark	500	5.94 to 5.98	SR 500/SR 503 and NE Fourth Plain Blvd - Construct Turn Lanes
104	Tier 1	Southwest	Cowlitz	411	11.77 to 12.27	SR 411/PH No 10 Rd - Build Roundabout
240	Tier 2	Southwest	Clark	14	6.46 to 8.38	SR 14/I-205 to SE 164th Ave - Add Auxiliary Lanes
305	Tier 3	Northwest	King	18	20.84 to 24.11	SR 18 - Issaquah-Hobart Road to Tigergate - Widening
306	Tier 3	Northwest	King	18	24.11 to 28.41	SR 18 - Tigergate to I-90 - Widening

Active Review with WSDOT Headquarters Systems Analysis and Program Development Office

Key	Category	WSDOT Region	County	Highway Number	Milepost	Title
29	Tier 1	North Central	Chelan	2	99.89 to 100.24	US 2/Leavenworth Vicinity - Signal Interconnection
420	Tier 1	Northwest	Snohomish	2	0 to 2.54	US-2 - I-5 to SR 204 - Active Traffic Management, EB Hard Shoulder Running
72	Tier 1	Olympic	Clallam	101	246.9 to 249.98	US 101/Eighth St to Brook Ave - Mobility
189	Tier 1	Olympic	Thurston	5	95.33 to 115	I-5/SR 121 (Maytown) I/C to Pierce County Line - Mobility (Stage 1 Fiber Optic Installation)
62	Tier 1	Olympic	Thurston	5	107.16 to 107.16	I-5/Pacific Ave Interchange NB Off Ramp - Mobility
93	Tier 1	South Central	Asotin	12	429.24 to 430.67	US 12/SR 128 to SR 129 - I/S Improvements and Signals
307	Tier 3	Northwest	Island	20	30.35 to 31.13	SR 20/Swantown Rd to Barrington Dr - Widening and Improvements
229	Tier 3	South Central	Yakima	12	200.71 to 201.8	US 12/16th Ave I/C - Widen WB Ramps and Crossover Bridge

Appendix R: Solutions with Advanced Analysis

The following list of solutions was developed to address mobility needs identified during the 2007-2026 HSP update process. Advanced analysis for these solutions was conducted during the 2007-2026 HSP Technical Update process. The following shows the updated information at the time of publication of this document.

WSDOT Headquarters Systems Analysis and Program Development Office Reviewed and Approved

Key	Category	WSDOT Region	Highway Number	Milepost	Title	Current or Future Problem	Cost Estimate
57	Tier 1	Olympic	5	99.35 to 99.35	I-5/SR 121 (93rd Ave) I/C SB Off Ramp - Mobility	Current	$1,488,000
		County	*Needs:*	Mobility Deficiency - Bottleneck/Chokepoint. Unsignalized approach with delay more than 50 seconds per vehicle at the Interstate 5 Southbound Off Ramp to SR 121 Interchange (93rd Ave. SW)			
		Thurston	*Solution:*	New signal and channelization (Separated right and left turn lanes along the off ramp and left turn lane on 93rd Ave. SW to the Southbound on).			
			Expected Benefits:	Intersection hours of delay improvement of $3,852,000 and $56,000 in safety benefit reductions for total benefits of $3,908,000. Freight will benefit with improved access into and out of two truck rest stops (located diagonially opposite each side of interchange)			
			Known Environmental Issues:	The truck stop located near the SB off ramp is a LUST site (leaking underground storage tank).			
66	Tier 1	Olympic	5	109.41 to 109.41	I-5/Martin Way Interchange Off Ramp - Mobility (Southbound)	Current	$1,311,000
		County	*Needs:*	Mobility Deficiency - Bottleneck and Chokepoint. Signalized ramp terminal with average delay more than 80 seconds per vehicle in 2003. Observed high traffic volumes at the southbound off ramp to Martin Way cause queuing into mainline I-5 during the PM peak period. This off-ramp directs traffic into the City of Lacey with connections to large retail stores and a major city street (College Avenue) and private college (St. Martins). Interchange ramp with signalized ramp terminal has insufficient capacity causing back-ups into mainline I-5 shoulder. Analysis of existing travel patterns and traffic volumes at this off ramp indicate that the level of service (LOS) is deteriorating. The ramp diverge influence area was approaching 85% of posted speed during peak commuter hours in 2003.			
		Thurston	*Solution:*	Proposal is for a double right turn on the SB off ramp. This project will add a southbound right turn lane to create two right turn lanes (extend the storage lane length of the existing left turn lane too).			
			Expected Benefits:	Intersection benefit of ~$2,791,000 and safety benefit of ~$627,405 for total benefits of ~$3,418,405. Interstate 5 is a T-1 freight route.			
			Known Environmental Issues:	There is one storm water outfall at the Martin Way I/C Undercrossing.			

Appendix R: Solutions with Advanced Analysis

The following list of solutions was developed to address mobility needs identified during the 2007-2026 HSP update process. Advanced analysis for these solutions was conducted during the 2007-2026 HSP Technical Update process. The following shows the updated information at the time of publication of this document.

WSDOT Headquarters Systems Analysis and Program Development Office Reviewed and Approved

Key	Category	WSDOT Region	Highway Number	Milepost	Title	Current or Future Problem	Cost Estimate
105	Tier 1	Southwest	500	0 to 5.96	SR 500/I-5 to NE Fourth Plain Blvd - Install ITS	Current	(1) $142,700 (2) $268,295 (3) $100,000 (4) $200,000 Total $710,995
		County	*Needs:*	Congested corridor			
		Clark	*Solution:*	(1) Variable Message Sign on Westbound SR 500 east of 42nd Ave (2) 6 Closed circuit televisions from MP 1.5 to MP 3.7 (42nd Ave to Thurston Way) (3) 6 Data stations from MP 1.5 to MP 3.7 (42nd Ave to Thurston Way) (4) Construct 9500 LF fiber communication		
			Expected Benefits:	(1) According to IDAS (ITS Deployment Analysis System, Version 2.3.), the project benefit during PM Peak Hour will be $78,000 (in 1995 dollar value), and the B/C ratio is 0.55. Only PM Peak Hour benefit is included in the calculation; the total benefit is higher. (2) Part of the regional multimodal traveler information system; support other ITS devices.		
			Known Environmental Issues:	Wetlands occur in limited areas in the SR 500 corridor, primarily associated with Burnt Bridge Creek and two small basins between NE 54th Avenue and Thurston Way. Proposed improvements at St. Johns Road and 54th Avenue will likely have wetland and riparian impacts. A northbound connection between SR 500 and I-5 may effect a short length of Burnt Bridge Creek and small associated wetlands and riparian corridor. A small wetland may occur on the SW corner of the SR 500/4th Plain intersection that could be effected by proposed modifications in this area. Any proposed projects in the vicinity of Andresen Road and the north side of SR 500 between Andresen and Thurston Way have the potential to effect an existing WSDOT wetland mitigation site. Impacts to wetland mitigation sites carry much higher replacement ratios than natural wetlands. Using a linear measurement of wetlands immediately adjacent to the highway, approximately 7,743 linear feet (1.47 miles) of wetland occur to the north of SR 500, and approximately 2,460 linear feet (0.47 miles) occur to the south of SR 500. Additional wetlands may be present a short distance from the highway, but were not included in this measurement. These figures are preliminary and subject to change with further analysis and formal wetland delineations. There are no fish barriers. There is one stream crossing (Burnt Bridge Cr.) in this corridor with associated riparian and wetland areas that provide habitat for vegetation, fish and wildlife. There are approximately 25 known stormwater outfalls located along this corridor.		
108	Tier 1	Southwest	500	5.94 to 5.98	SR 500/SR 503 and NE Fourth Plain Blvd - Construct Turn Lanes	Current	$3,910,000
		County	*Needs:*	Intersection of two high volume regional arterials; long queuing. This intersection is an identified bottleneck/chokepoint.			
		Clark	*Solution:*	Construct NB to EB dual right turns at Fourth Plain Rd; add receiving lane on Fourth Plain.			
			Expected Benefits:	The mobility benefit for state facility is estimated to be $25 million using WSDOT Mobility Prioritization Process Program (MPPP). The Benefit/Cost Ratio is expected to be 7.22. The benefit analysis does not include the mobility and safety benefits occurring on the local facility.			
			Known Environmental Issues:	A small wetland may occur on the SW corner of the SR 500/4th Plain intersection that could be effected by proposed modifications in this area.			

Appendix R: Solutions with Advanced Analysis

The following list of solutions was developed to address mobility needs identified during the 2007-2026 HSP update process. Advanced analysis for these solutions was conducted during the 2007-2026 HSP Technical Update process. The following shows the updated information at the time of publication of this document.

WSDOT Headquarters Systems Analysis and Program Development Office Reviewed and Approved

Key	Category	WSDOT Region	Highway Number	Milepost	Title	Current or Future Problem	Cost Estimate
104	Tier 1	Southwest	411	11.77 to 12.27	SR 411/PH No 10 Rd - Build Roundabout	Current	$850,000
	County	*Needs:*	Four-way stop controlled intersection results in significant delay. This intersection is an identified bottleneck/chokepoint in the region.				
	Cowlitz	*Solution:*	Replace four-way stop with single-lane roundabout.				
		Expected Benefits:	Approximately $5,750,000 in mobility benefits and $472,000 in safety benefits are expected.				
		Known Environmental Issues:	Wetlands occur throughout this area. The Cowlitz River provides habitat for salmon and other Endangered Species Act listed species. Critical areas such as Flood Plains and Critical Aquifer recharge areas are present in the area.				
240	Tier 2	Southwest	14	6.46 to 8.38	SR 14/I-205 to SE 164th Ave - Add Auxiliary Lanes	Current	$28,800,000
	County	*Needs:*	Increased volume without increased capacity. Currently deficient (LOS=F) during peak hours. This highway segment is an identified bottleneck/chokepoint.				
	Clark	*Solution:*	Re-stripe and extend ramps between I-205 and 164th Ave., including I-205 NB off-ramp modifications.				
		Expected Benefits:	B/C: 8.64. Based on the WSDOT Mobility Project Prioritization Process software estimates, this project will bring $190 million mobility benefits and $19 million safety benefits, with a benefit-cost ratio of 8.64. The ratio of peak hour speed to post speed in 2030 will be increased from 58% under no-build scenario to 82% under build scenario (Highway Segment Analysis Program).				
		Known Environmental Issues:	Small wetlands occur primarily on the north side of the highway where ditches and cut slopes have intercepted natural groundwater. Total estimated wetland impacts area is 0.5 acres. This figure is preliminary and subject to change with further analysis and formal wetland delineations. There are quite a few known stormwater outfalls located along this section of SR 14.				
305	Tier 3	Northwest	18	20.84 to 24.11	SR 18 - Issaquah-Hobart Road to Tigergate - Widening	Current	$64,280,000
	County	*Needs:*	SR 18 congested corridor segment in the AM/PM peak periods.				
	King	*Solution:*	Widen to four lanes.				
		Expected Benefits:	This will address congestion deficiency on this section of SR 18.				
		Known Environmental Issues:	Sensitive areas, such as wetlands and streams within the corridor, are marked early design in order to avoid negative impacts whenever reasonably possible. The Maple Valley to Issaquah Hobart Road section includes creation, enhancement and purchase of we				

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The following list of solutions was developed to address mobility needs identified during the 2007-2026 HSP update process. Advanced analysis for these solutions was conducted during the 2007-2026 HSP Technical Update process. The following shows the updated information at the time of publication of this document.

WSDOT Headquarters Systems Analysis and Program Development Office Reviewed and Approved

Key	Category	WSDOT Region	Highway Number	Milepost	Title	Current or Future Problem	Cost Estimate
306	Tier 3	Northwest	18	24.11 to 28.41	SR 18 - Tigergate to I-90 - Widening	Current	$76,840,000

County	King
Needs:	SR 18 congested corridor segment in the AM/PM peak periods.
Solution:	Widen to four lanes.
Expected Benefits:	This will address congestion deficiency on this section of SR 18.
Known Environmental Issues:	Sensitive areas, such as wetlands and streams within the corridor, are marked early design in order to avoid negative impacts whenever reasonably possible. The Maple Valley to Issaquah Hobart Road section includes creation, enhancement and purchase of we

Appendix R: Solutions with Advanced Analysis

The following list of solutions was developed to address mobility needs identified during the 2007-2026 HSP update process. Advanced analysis for these solutions was conducted during the 2007-2026 HSP Technical Update process. The following shows the updated information at the time of publication of this document.

Active Review with WSDOT Headquarters Systems Analysis and Program Development Office

Key	Category	WSDOT Region	Highway Number	Milepost	Title	Current or Future Problem	Cost Estimate
29	Tier 1	North Central	2	99.89 to 100.24	US 2/Leavenworth Vicinity - Signal Interconnection	Current	Unknown
	County	*Needs:*	This section of US 2 is located entirely within the city of Leavenworth. The city is a major tourist attraction and surrounded by recreational opportunities.				
	Chelan	*Solution:*	Signal interconnection				
		Expected Benefits:	Congestion relief through better traffic flow management				
		Known Environmental Issues:	Historical properties, potential wetlands if a new route is selected, and urban development conflicts. Societal impacts include increased noise, historical buildings and residential units.				
420	Tier 1	Northwest	2	0 to 2.54	US-2 - I-5 to SR 204 - Active Traffic Management, EB Hard Shoulder Running	Current	Unknown
	County	*Needs:*	Currently, motorists experience considerable delay on eastbound US-2 during the PM peak traffic hour. These delays occur from I-5 to SR 204. Expansion of US-2 currently is not an option and hard shoulder use is a more affordable option.				
	Snohomish	*Solution:*	Provide the shoulder on eastbound US-2 for use during the PM peak hour from I-5 to SR 204				
		Expected Benefits:	HCS analysis shows that use of the shoulder in the PM can improve the LOS from F in 2020 to LOS D. The Benefit Cost Ratio is over 2.0 for this project				
		Known Environmental Issues:	This project involves sigining and striping of exisitng impervious pavement. No know environmental impacts will occur as part of this project.				
72	Tier 1	Olympic	101	246.9 to 249.98	US 101/Eighth St to Brook Ave - Mobility	Current	Unknown
	County	*Needs:*	Mobility Deficiency - Bottleneck and Chokepoint. The high volumes in the two general purpose lanes in combination with signals reduce capacity along mainline US 101 in Port Angeles Core Business District between Race Street and Golf Course Road. Race Street is a recreational link to Hurricane Ridge and also a bypass to a portion of downtown Port Angeles. Recreational route with signalized intersections are causing congestion on mainline. It is important to note that the V/C ratios along mainline in 2003 range from 0.79 to 0.98. It is highly likely that the signal systems in Port Angeles will be less than 70% of posted speed threshold on a daily basis after 2007.				
	Clallam	*Solution:*	Signal interconnection				
		Expected Benefits:	Safety benefits for mainline only for ~$29,077,000. This segment is also a T-2 freight route which is used by the Port of Port Angeles and is a recreational route from Hurricane Ridge in the Olympic National Park and private ferry to Victoria B.C.				
		Known Environmental Issues:	There are 4 nearby fish passage barriers that appear to require repair.				

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Active Review with WSDOT Headquarters Systems Analysis and Program Development Office

Key	Category	WSDOT Region	Highway Number	Milepost	Title	Current or Future Problem	Cost Estimate
189	Tier 1	Olympic	5	95.33 to 115	I-5/SR 121 (Maytown) I/C to Pierce County Line - Mobility (Stage 1 Fiber Optic Installation)	Current/Future	Unknown
	County	*Needs:*	Mobility Deficiency - Bottleneck and Chokepoint. A combination of high traffic volumes and on ramp weaves along Interstate 5 cause frequent back-ups in the PM peak. Traffic backs up in the vicinity of I-5/US 101 Interchange to Olympia City Center exits and between Pacific Avenue and Martin Way interchanges. Analysis of existing travel patterns and traffic volumes along Interstate 5 between Trosper Road Interchange and the Thurston/Pierce County Line indicate that the level of service is deteriorating. The weighted mainline segment along Interstate 5 is approaching or at 70% of the posted speed during the PM peak commuter hours in 2005 and more than 70% of the posted speed threshold in 2030.		
	Thurston	*Solution:*	Intelligent Transportation System improvements other than ramp metering between Maytown I/C and Thurston/Pierce County Line.				
		Expected Benefits:	General purpose lane capacity improvements for recurring congestion improvement benefits of $37,204,000.				
		Known Environmental Issues:	There are no known environmental issues that would impact this work (trenching for fiber optic cable installation)				
62	Tier 1	Olympic	5	107.16 to 107.16	I-5/Pacific Ave Interchange NB Off Ramp - Mobility	Future	Unknown
	County	*Needs:*	Mobility Deficiency - Bottleneck and Chokepoint.				
	Thurston	*Solution:*	Create an I-5 Northbound off ramp double left turn movement to Westbound Pacific Avenue at the ramp terminal and consider modifying the existing Eastbound Pacific Avenue roadway section to extend or create a double left turn movement toward the I-5 Northbound on ramp terminal.				
		Expected Benefits:	Intersection benefits for ~$861,000 and safety benefits for ~$728,000. Total benefits of ~$1,589,000.				
		Known Environmental Issues:	There are no known environmental issues associated with this specific work.				
93	Tier 1	South Central	12	429.24 to 430.67	US 12/SR 128 to SR 129 - I/S Improvements and Signals	Future	Unknown
	County	*Needs:*	This section of US 12 experiences many rear-end type accidents due to slowing traffic caused by congestion and inattentive drivers. Approximately 1/3 of all accidents in the corridor are rear-end.				
	Asotin	*Solution:*	This improvement project will upgrade intersections and install signals through the Clarkston area.				
		Expected Benefits:	This project will serve to maintain the effectiveness of the facility and to enhance safe operations in areas where turning movements are creating congestion and delay. There are $12,023,594 in safety benefits associated with this improvement.				
		Known Environmental Issues:	None				

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The following list of solutions was developed to address mobility needs identified during the 2007-2026 HSP update process. Advanced analysis for these solutions was conducted during the 2007-2026 HSP Technical Update process. The following shows the updated information at the time of publication of this document.

Active Review with WSDOT Headquarters Systems Analysis and Program Development Office

Key	Category	WSDOT Region	Highway Number	Milepost	Title	Current or Future Problem	Cost Estimate
307	Tier 3	Northwest	20	30.35 to 31.13	SR 20/Swantown Rd to Barrington Dr - Widening and Improvements	Current	Unknown
	County	*Needs:*	23% of posted speed limit				
	Island	*Solution:*	Construct four (4) Roundabouts at the Swantown Road, Erie Street, Beeksma/Pioneer Way, and Barrington Drive intersetions.				
		Expected Benefits:	Reduced delays at intersections, and reduction of queuing.				
		Known Environmental Issues:	There are 2 bald eagle nests adjacent to the corridor within 700- 350 feet of the roadway. There are several wetlands mapped proximal to the right of way and several stream cross roadway. Bald eagle nests and wetlands would require ground verification.				
229	Tier 3	South Central	12	200.71 to 201.8	US 12/16th Ave I/C - Widen WB Ramps and Crossover Bridge	Current	Unknown
	County	*Needs:*	Stop controlled intersection of the WB off ramp with 16th Ave. causes traffic to back up down the ramp to the main line during peak hours of the day. The other heavy movement is from northbound 16th Ave. to WB on-ramp. Current bicycle-pedestrian crossing on bridge has potential for safety and operational concerns.				
	Yakima	*Solution:*	Widen US 12/16th Avenue interchange bridge to accommodate an additional lane, and make ramp improvements including adding a lane to both the off- and on-ramps, a double left turn or a two-lane roundabout.				
		Expected Benefits:	Making these interchange improvements will reduce backups on the WB ramp and provide greater interchange capacity.				
		Known Environmental Issues:	The route parallels the Naches river, with sensitive areas immediately adjacent to the highway, in various locations within the corridor. The river flooded causing extensive damage to both private and public lands in 1996.				

Appendix S: Low Cost Freight Solutions

Key	WSDOT Region	Highway Number	Milepost	Title	Cost Estimate
1	Eastern	US 395	157.41 to 167.86	US 395/ North Spokane Corridor Interim Improvements Francis Street to I-90	$2,200,000
		Solution:	Minor improvements could be made in the near-term to maintain flow from Francis Street to I-90 until the full North Spokane Corridor is funded and completed. The corridor improvements have been funded from Wandermere to Francis Street, which will be completed in 2011. This project would study alternatives and design improvements that will maintain flow until the full corridor improvements are funded and completed.		
	County Spokane	*Expected Benefits:*	Maintains flow on freight route until full project improvements are constructed. Provides operational improvements to improve safety, maintain capacity, and decrease congestion.		
2	North Central	US 2 I-90	48.71 to 64.63 55.1 to 103	US 2 Stevens Pass and I-90 Snoqualmie Pass Improved Truck Traveler Information	$1,900,000
		Solution:	Improvements to Intelligent Transportation Systems (ITS) on and in the vicinity of US 2 Stevens Pass and I-90 Snoqualmie Pass to increase access to information while on the road. The project would benefit general traffic as well as freight. Includes improving ITS systems on US 2 in the Stevens Pass area and adding a variable speed limit sign to actively manage traffic and provide better information on roadway conditions. Install information kiosk at the I-90 Winchester Waste Way rest areas to provide real-time information on delays and pass conditions. Add new cameras, potentially at Moses Lake, Othello, and the Vernita areas, to aide in incident management and allow for visual observation of congestion and roadway conditions. Add a Highway Advisory Radio site on I-90 to provide real-time communication of road and weather conditions. This project complements, and is adjacent to, the I-90 Snoqualmie Pass - Improved Truck Traveler Information project.		
	County King, Kittitas, Grant, Chelan	*Expected Benefits:*	Improves information on road conditions and closures so that freight dependent industries and carriers can plan for trips over the state's east-west freight routes. Provides advance notification to prepare for driving conditions, choose alternate routes, and adjust delivery schedules.		
3	Northwest	SR 99	34.73 to 40.48	SR 99 Travel Time Improvements for Trucks	$200,000
		Solution:	Work with City of Seattle to improve signal timing for trucks on SR 99 (Aurora Avenue) from north through Shoreline. Collect additional information on truck origin and destination on SR 99 to identify benefit and need. In 2006, there were over 5,500 trucks per day on Aurora Avenue N north of N 50th Street (near the Woodland Park Zoo), or about 15% of the total traffic. The percentage of trucks increased during the peak hours to over 18% of the total traffic. While this is a major highway serving Seattle, it is not often perceived as a highly used truck route.		
	County King	*Expected Benefits:*	Reduces delay and congestion on alternative freight route to I-5 north of Seattle. Maintains functionality of corridor to maintain flow during Alaskan Way Viaduct construction.		

Appendix S: Low Cost Freight Solutions

Key	WSDOT Region	Highway Number	Milepost	Title	Cost Estimate
4	Northwest	SR 543	1.09 to 1.09	SR 543 - Free and Secure Trade Program Utilization	$30,000
		Solution:	Free and Secure Trade program (FAST). FAST allows for pre-approved trucks to quickly cross the border, much like Nexus, used by passenger vehicles. A new dedicated lane for northbound trucks using FAST was built in August 2008, partially funded through the state's 2003 Legislative Funding Package. The dedicated lane is currently underutilized. This study would survey commercial trucks at the border crossing to determine why they are not currently using FAST and what features would make FAST attractive enough to cause them to enroll. Analysis would include recommendations to increase industry enrollment in FAST. This would reduce border crossing times for commercial trucks, increase utilization of the dedicated lane recently constructed, and provide increased safety and security for US – Canadian trade.		
	County				
	Whatcom	*Expected Benefits:*	Reduces delay and increases safety at the busiest commercial truck crossing on Washington - Canadian border; and fourth busiest of all US - Canadian border crossings. Identifies casual factors for FAST enrollment and identifies recommendations to increase use. FAST approved trucks receive expedited clearance and have dedicated lane recently constructed by the state.		
5	Northwest & Olympic			Pilot Project - Ramp Meter Improvements for Heavy Trucks	$400,000
		Solution:	Pilot project to evaluate potential benefits of ramp meter by-pass or relocation of ramp meters for heavy trucks. Locations with steep grades or short ramps where the trucks cannot obtain speed prior to merging on highway. Project will conduct up to three demonstration studies to test the operational benefits or disadvantages of either allowing trucks to bypass the ramp meter using the HOV lane or relocating the ramp meters to increase the acceleration distance. Potential ramp locations include: Corson Avenue southbound on-ramp to I-5, Northbound West Valley Highway (SR 181) on-ramp to northbound I-405, Central Avenue northbound on-ramp to SR 167, Leary Way/West Lake Sammamish Parkway westbound on-ramp to SR 520, SR 516 on-ramps to northbound and southbound SR 167. Reduces congestion by allowing trucks to gain adequate speed before merging onto mainline highway. Reduces the risk of crashes and improves safety. Improves mainline capacity for general-purpose traffic by increasing the speed that trucks can merge into traffic.		
	County				
	Multiple	*Expected Benefits:*	Improves truck mobility by improving acceleration and merge conditions. Reduces truck delay in queue at ramp meters. Reduces congestion and improves safety on major freight corridors.		
6	Northwest & Olympic			Geometric Improvements for Trucks at Freeway Ramps - Identify Needs and Design	$500,000
		Solution:	Identify needs and design geometric improvements on freeway ramps to better accommodate trucks. Radius improvements so that trucks can navigate turn, lengthened ramps to allow trucks to obtain merge speed. These improvements could include widening the turning radii where the ramp connects to the local arterials; enlarging the radius of a loop ramp; or extending a ramp to increase the acceleration distance before the merge point. The following lists candidate locations where improvement needs have been identified: SR 167 15th St SW southbound; 8th St E southbound; S 212th St northbound. I-5 SR 516 southbound; Spring Street southbound. SR 99 S Cloverdale St northbound. Final design and construction cost to be determined.		
	County				
	Multiple	*Expected Benefits:*	Radius improvements enhance truck mobility and safety by reducing chance that turning trucks ride up on to a curb or fall off the pavement edge. Lengthened ramps increase truck speeds at merge points, which reduces merge-induced congestion along a freeway's mainline. Lengthened ramps improve safety by increasing distance that vehicles have to merge, and reducing the differential in speeds between the merging and mainline traffic.		

Appendix S: Low Cost Freight Solutions

Key	WSDOT Region	Highway Number	Milepost	Title	Cost Estimate
7	Northwest & Olympic			Improved Signage for Truck Movements - Central Puget Sound	$750,000
		Solution:	Conduct a comprehensive review of signage issues and potential improvements, evaluate and prioritize signage improvements based on truck movement benefit, and develop a uniform design practice and protocol for truck signage. There are various locations where improved signage could reduce confusion for truck drivers that are unfamiliar with the area, and enhance safety by increasing the decision time that a truck driver needs in advance of changing lanes to follow their intended route. In addition, at some locations, the size and volume of trucks block visibility of advance guide signing for general-purpose traffic. At freeway ramps located along multi-lane arterials, truck drivers may need advance guidance to get into the appropriate access lane. In some locations, hazardous materials may be prohibited and there often is no signage on alternate routes.	
	County				
	Multiple	*Expected Benefits:*	Improves safety by improving driver guidance. Minimizes weaving and sudden lane changes by trucks and/or general-purpose traffic, excess travel time due to wrong directional decisions, and driver frustration. Provides clearer signage of alternate routes when hazardous materials are prohibited.		
8	Olympic	SR 167	0 to 6	SR 167/SR 509 to SR 161 - Extension of Freeway - Interim Solutions	$1,000,000
		Solution:	Identify and design strategies to maintain adequate access and improve truck routing on local roads until the SR 167/ SR 509 to SR 161 extension project can be funded and built. Local streets and arterials are used to transport freight to and from the Port of Tacoma, Green River Valley and Interstate 90, creating more congestion related delays and unsafe conditions on surface streets. The existing non-freeway segment of SR 167 is on surface streets and includes a circuitous route through Puyallup via Meridian Avenue and River Road.		
	County				
	Pierce	*Expected Benefits:*	Design and prepare project if construction funds become available. If funding, construction would reduce congestion on existing mainline segments by adding an alternative route between the Port of Tacoma , the Green River Valley, I-90, and Central Puget Sound. SR 167 serves freight warehouses in the Green River Valley.		
9	Olympic	SR 167	0 to 6	I-5 - Connectors to Port of Tacoma and Fife Industrial Area Analysis	$250,000
		Solution:	A study is needed to develop a comprehensive plan to accommodate truck trip growth generated by new development in Fife and the Port of Tacoma onto I-5. Local streets and arterials are used to transport freight to and from the Port of Tacoma, Green River Valley and Interstate 90, creating more congestion related delays and unsafe conditions on surface streets.		
	County				
	King	*Expected Benefits:*	Maintains access from state's major freight route to freight trip generator and port facilities. Accommodate truck trip growth generated by new developments.		

Appendix S: Low Cost Freight Solutions

Key	WSDOT Region	Highway Number	Milepost	Title	Cost Estimate
10	South Central	I-90	55.1 to 109.33	I-90 Snoqualmie Pass - Improved Truck Traveler Information	$2,000,000
		Solution:	Improvements to Intelligent Transportation Systems (ITS) on and in the vicinity of I-90 Snoqualmie Pass to increase access to information while on the road. The project would benefit general traffic as well as freight. Includes replacing the MIST System that controls variable speed limits and traction advisory to allow for more direct communication and accurate information. Upgrade the Highway Advisory Radio and improve coverage to provide real-time communication of road and weather conditions. Add new cameras to aid in incident management and allow for visual observation of congestion and roadway conditions. Install information kiosks at rest areas to provide advance notification of roadway and weather conditions. Add a Variable Message Sign (VMS) in I-90 Ellensburg vicinity to provide real-time information on delays. This project complements, and is adjacent to, the US 2 Stevens Pass and I-90 Snoqualmie Pass Improved Truck Traveler Information project.	
	County				
	Kittitas	*Expected Benefits:*	Improves information on road conditions and closures so that freight dependent industries and carriers can plan for trips over the state's major east-west freight route. Provides advance notification to prepare for driving conditions, choose alternate routes, and adjust delivery schedules.		
11	Southwest			I-5 - Connectors to Port of Vancouver Analysis	$300,000
		Solution:	A study is needed to determine how to maintain adequate access from Port of Vancouver to I-5. Port of Vancouver is a generator of truck trips, approximately 200,000 truck trips per year. Current access to the state's major freight route, I-5, is on 4th Plain and Mill Plain Boulevard. Mill Plain Boulevard currently handles 77% of daily truck traffic to and form the port's main entrance. Planned changes to this area of Vancouver, WA and the I-5 Columbia River Crossing project will impact capacity and access from I-5 to the port facilities.		
	County				
	Clark	*Expected Benefits:*	Maintains access from state's major freight route to freight trip generator and port facilities.		
12	Statewide			Improved Signage for Truck Movements - All Regions in Greater Washington except for Central Puget Sound	$750,000
		Solution:	Conduct a comprehensive review of signage issues and potential improvements, evaluate and prioritize signage improvements based on truck movement benefit, and develop a uniform design practice and protocol for truck signage. There are various locations where improved signage could reduce confusion for truck drivers that are unfamiliar with the area, and enhance safety by increasing the decision time that a truck driver needs in advance of changing lanes to follow their intended route. In addition, at some locations, the size and volume of trucks block visibility of advance guide signing for general-purpose traffic. At freeway ramps located along multi-lane arterials, truck drivers may need advance guidance to get into the appropriate access lane. In some locations, hazardous materials may be prohibited and there often is no signage on alternate routes.		
	County				
	Statewide	*Expected Benefits:*	Improves safety by improving driver guidance. Minimizes weaving and sudden lane changes by trucks and/or general-purpose traffic, excess travel time due to wrong directional decisions, and driver frustration. Provides clearer signage of alternate routes when hazardous materials are prohibited.		

Appendix S: Low Cost Freight Solutions

Key	*WSDOT Region*	*Highway Number*	*Milepost*	*Title*	*Cost Estimate*
13	Statewide			Truck Advanced Traveler Information System	Ongoing
		Solution:		Build Truck Advanced Traveler Information System. This project would expand WSDOT's existing advanced traveler information system in 2009-2011 to provide information specifically tailored to the needs of the trucking community. The information would be provided via web and phone, and could also be "pushed" out via subscription email alerts. Truck specific information that WSDOT already has in various locations on the web would be consolidated. The project would also maintain the data and add new information as needs arise. It would also develop an outreach program to educate trucking firms about the information available.	
	County				
	Statewide	*Expected Benefits:*		Improves truck mobility due to increased knowledge of construction activity, incidents, and border congestion that allows trucks to plan routes and schedule travel. Reduces local impacts with improved information about truck parking options. Improves safety due to increased compliance with weight and permitting restrictions.	
14	Areas Identified in Truck Parking Study			Truck Parking in High Demand Locations	$5,000,000
		Solution:		Improve truck parking services and ensure adequate supply of truck parking in high demand locations so that commercial truck drivers can park and rest. Current federal regulations require truck drivers to take 10-hour rest periods after 11- hours of driving in a 14-hour period. Therefore, trucks need a place to park during these 10-hour rest periods, and trucks also require short-term parking when they are waiting to make a delivery or to pick-up a load.	
	County				
	Statewide	*Expected Benefits:*		Improves safety on major freight routes. Ensures that there is safe, secure and legal places for commercial truck drivers to park and take manadatory rests.	